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XXV. Let ABC be a triangle, right-angled at C. Complete the figure as indicated.

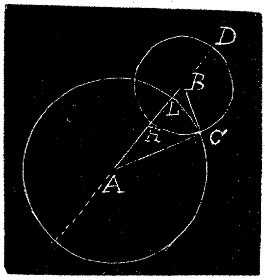

Fig. 20.

Then, $\overline{AC}^2=AH\cdot AD$, and $\overline{BC}^2=BL\cdot BE$.

Add, $\overline{AC}^2+BC=AH\cdot AD+BL\cdot BE$

$=(AB-BC)(AB+BC)+(AB-AC)(AB+AC)$.

$\therefore\ \overline{AB}^2=\overline{AC}^2+\overline{BC}^2$.

Richardson's method is somewhat different. Thus:

$$\overline{AC}^2+\overline{BC}^2=AH(AB+BC)+BL(AB+AC)$$
$$=AB(AH+BL)+AH\cdot BC+BL\cdot AC+BL\cdot AB-BL\cdot AB$$
$$=AB(AH+BL)+AH\cdot BC+BL(BL+2AC)-BL\cdot AB$$
$$=AB(AH+BL)+AH\cdot BH+\overline{BH}^2-BL(AH+BH)$$
$$=AB(AH+BL)+(AH+BH)(BH-BL)$$
$$=AB(AH+BL)+AB\cdot HL=AB(AH+BL+HL)=\overline{AB}^2.$$

XXVI. Fig. 20.

$EH : ED :: HL : DL$. (See Olney, §971). $\therefore EH\cdot DL=ED\cdot HL$,

or $(AC+AB-BC)(BC+AB-AC)=(AC+AB+BC)(AC+BC-AB)$.

$\therefore\ \overline{AB}^2=\overline{AC}^2+\overline{BC}^2$.

ARITHMETIC.

Conducted by **B. F. FINKEL**, Springfield; Mo. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

70. Proposed by **J. A. CALDERHEAD**, M. Sc., Professor of Mathematics in Curry University, Pittsburg, Pennsylvania.

A owes me $100 due in 2 years, and I owe him $200 due in 4 years; when can I pay him $100 to settle the account equitably, money being worth 6%?

I. Solution by the **PROPOSER**, and **P. S. BERG**, Larimore, North Dakota.

Let x=the time.

Now the amount of \$200 for $(x-4)$ years—the amount of \$100 for $(x-2)$ years must=\$100.

$200+12(x-4)=152+12x$=amount of \$200 for $(x-4)$ years at 6%.

$100+6(x-2)=88+6x$=amount of \$100 for $(x-2)$ years at 6%.

$\therefore$ $(152+12x)-(88+6x)=100$. $\therefore$ $x=6$ years.

II. Solution by Hon. **J. H. DRUMMOND, LL. D.**, Portland, Maine.

Computing at simple interest,

$\$\frac{200}{124}-\$\frac{100}{112}=\$72\frac{1}{217}$, amount equitably due now.

Hence, $\$100-\$72\frac{1}{217}=\$27\frac{216}{217}$ to be earned as interest.

$\$27\frac{216}{217}\div(72\frac{1}{217}\times\frac{6}{100})=5\frac{31}{75}$, the number of years required.

III. Solution by **NELSON S. RORAY**, South Jersey Institute, Bridgeton, New Jersey.

In this I assume interest to remain unpaid until the time of settlement, and to *draw no interest.*

A owes me to-day the present worth of \$100 due in 2 years at 6%, or \$89.29.

I owe A to-day the present worth of \$200 due in four years at 6%, or \$161.29.

That is, I owe A \$72 more than he owes me. Hence the problem reduces itself to the question, when will the excess of my interest over his plus \$72 amount to \$100? That is, my interest must exceed his by \$28.

My yearly excess is \$4.32. Hence to gain \$28, 6.481 years will be required.

GEOMETRY.

Conducted by **B. F. FINKEL**, Springfield, Mo. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

65. Proposed by **I. J. SCHWATT, Ph. D.**, Professsor of Mathematics, University of Pennsylvania, Philadelphia, Pennsylvania.

The axes of the ellipse isogonal to Lemoine's line with respect to a triangle (Steiner's ellipse), are parallel to Simson's lines belonging to the extremities of Brocard's Diameter.